Xsan Configuration, Optimization and Integration Best Practices

Session 624

These are confidential sessions—please refrain from streaming, blogging, or taking pictures.

At the convention center, a movie will be placed here

Xsan Configuration, Optimization and Integration Best Practices

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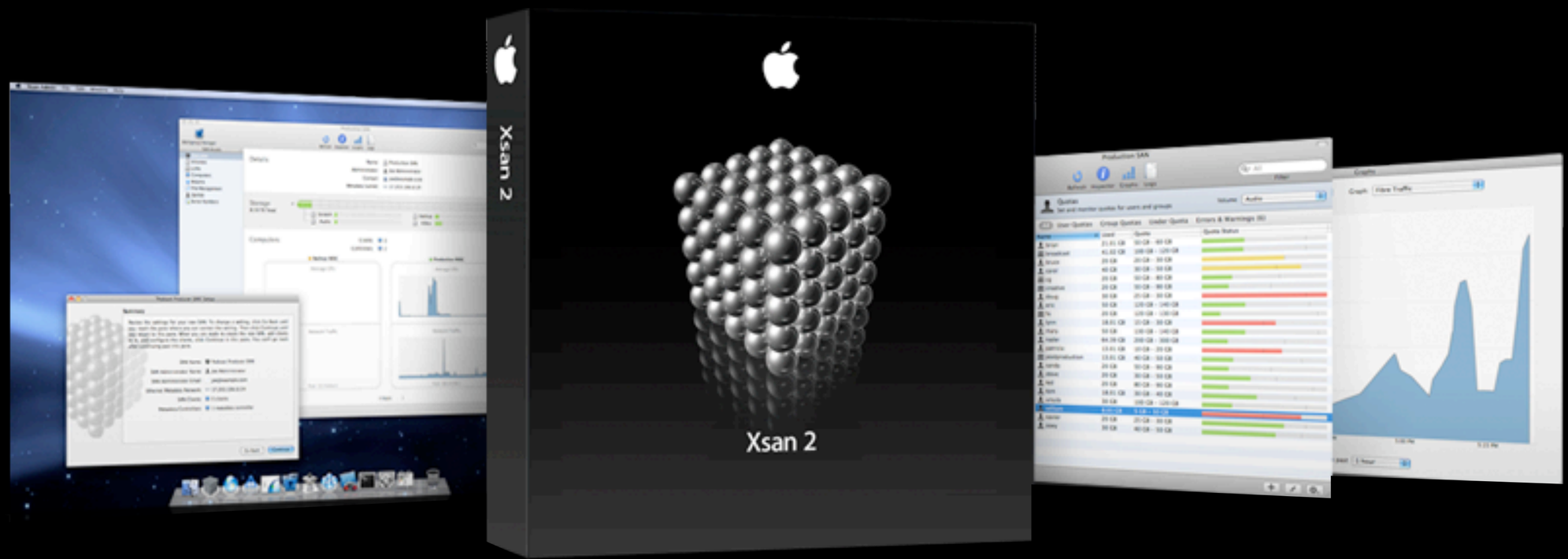
Xsan 2: The SAN File System for Mac OS X

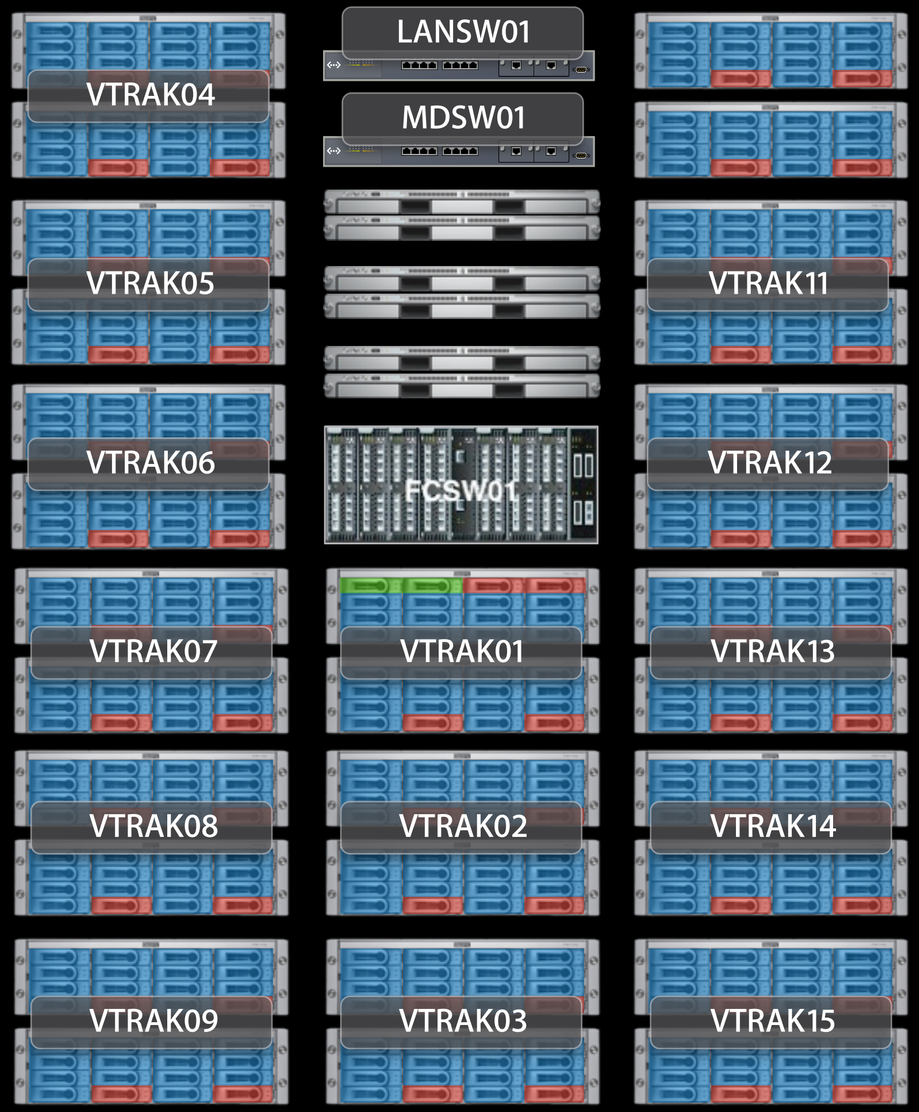


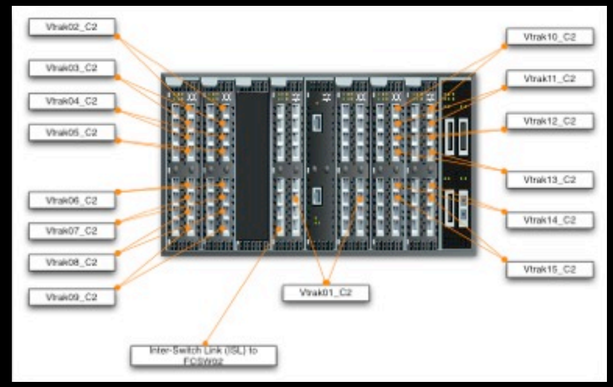
What You'll Learn Today

- Where is Xsan being deployed today
- What's new in Xsan 2.2
- Best practices for Xsan in large-scale deployments
- Latest backup solutions for Xsan
- Tuning
- Xsan Debugging
- Promise updates
- Apple Q&A

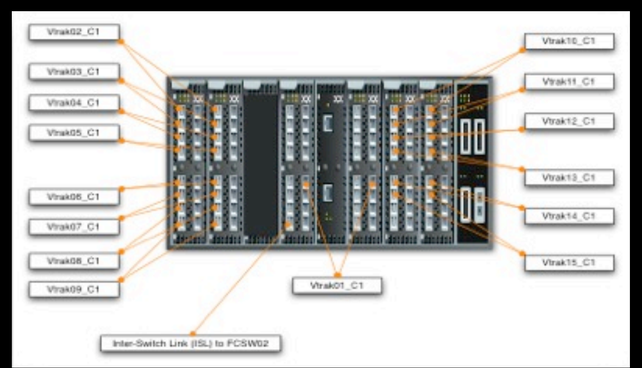
Xsan 2

Forensics storage solutions



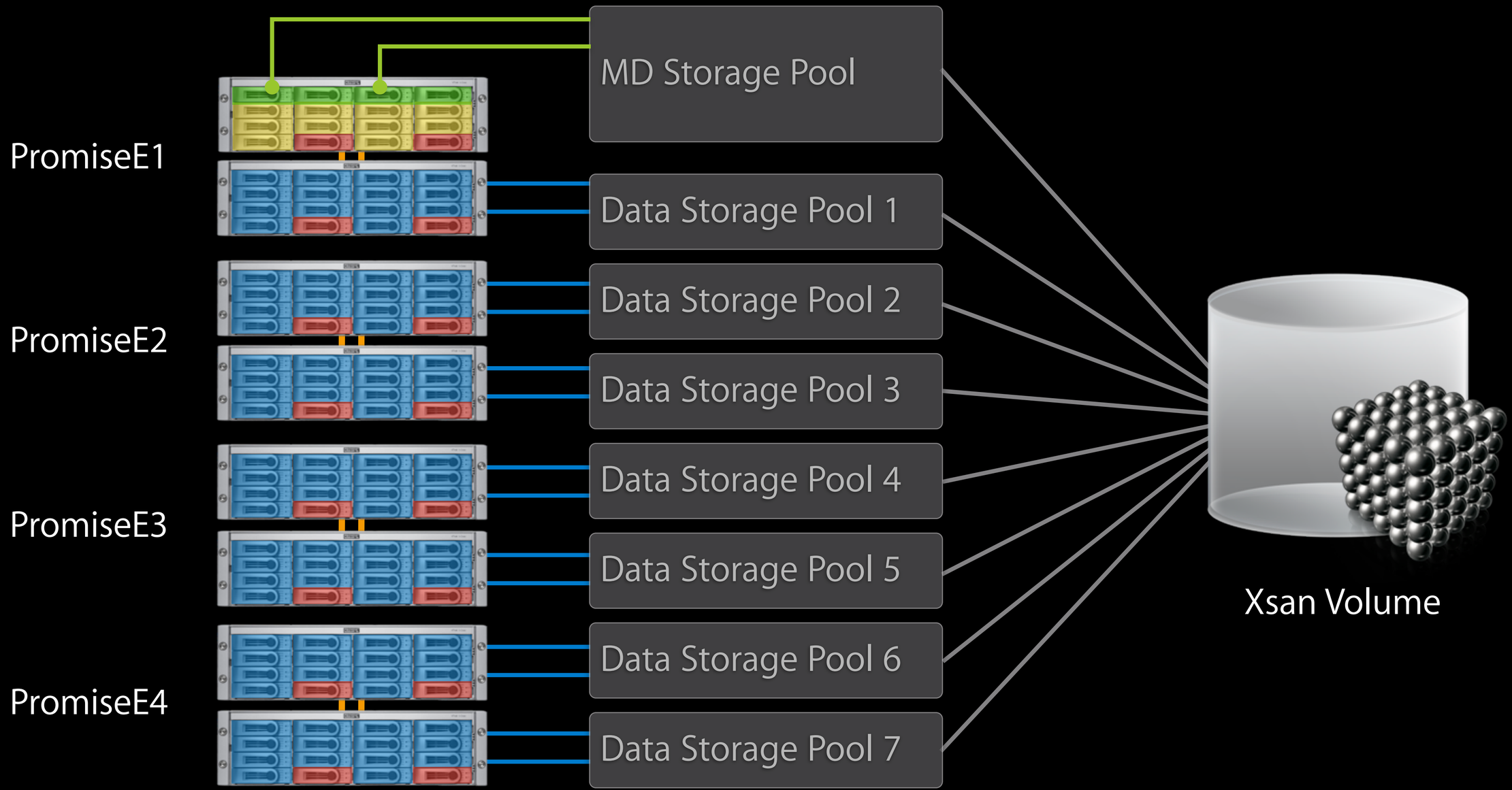


250TB!



Xsan 2

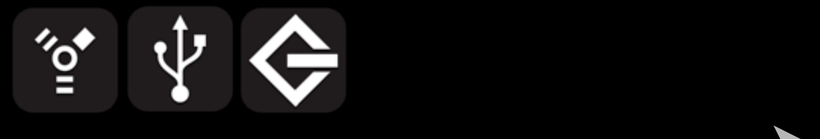
Final Cut Server and Podcasting



Xsan Overview

File System Comparison

Local file system



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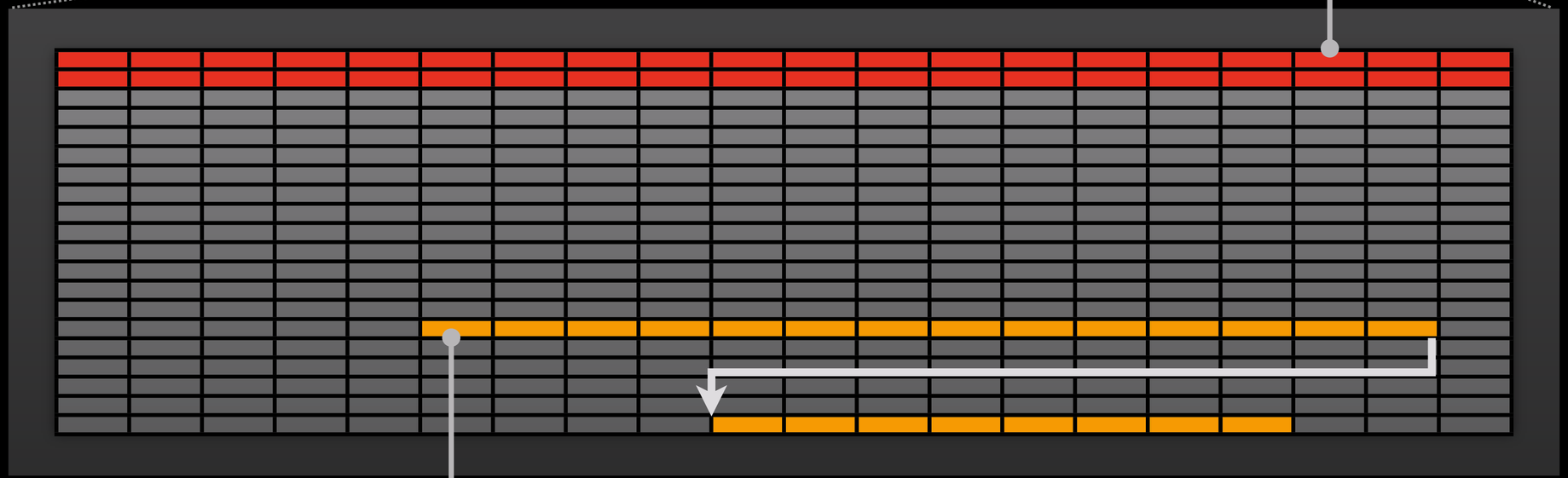
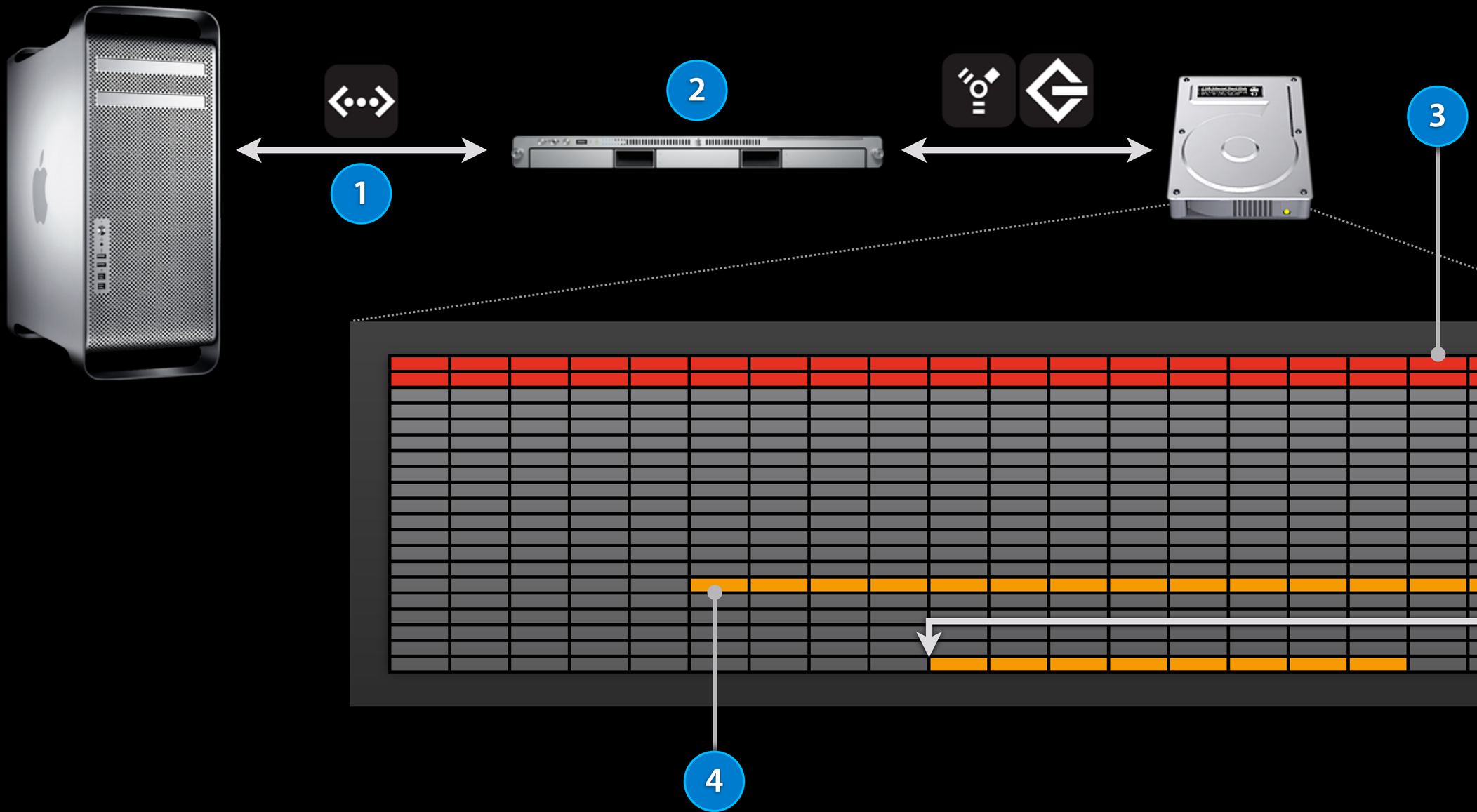


3

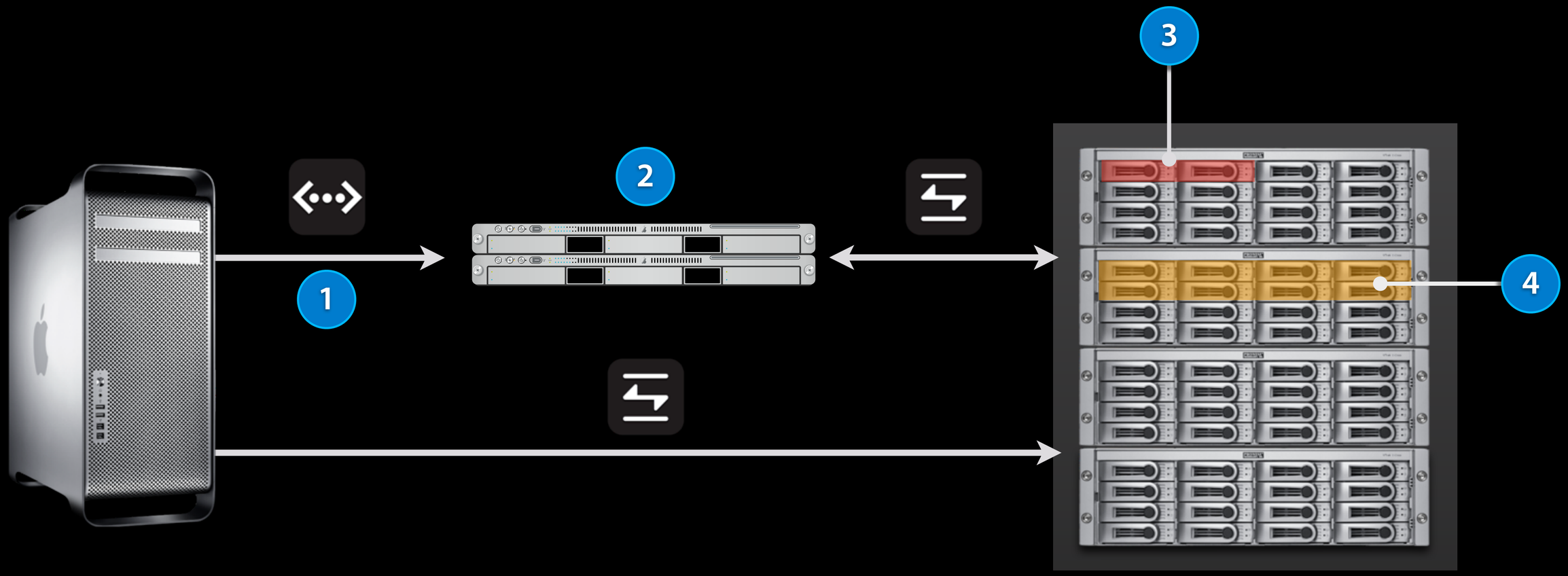
File System Comparison

Local file system



File System Comparison

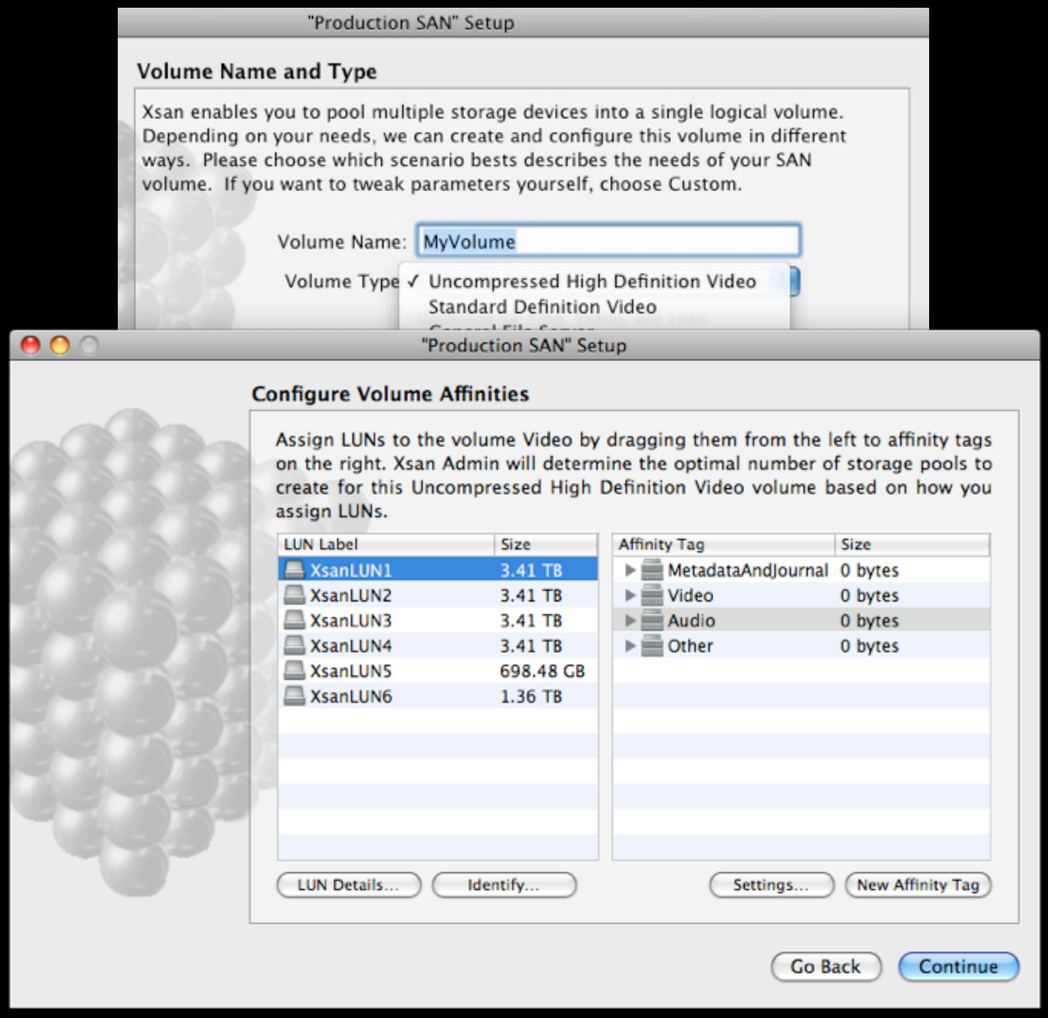
Clustered file system

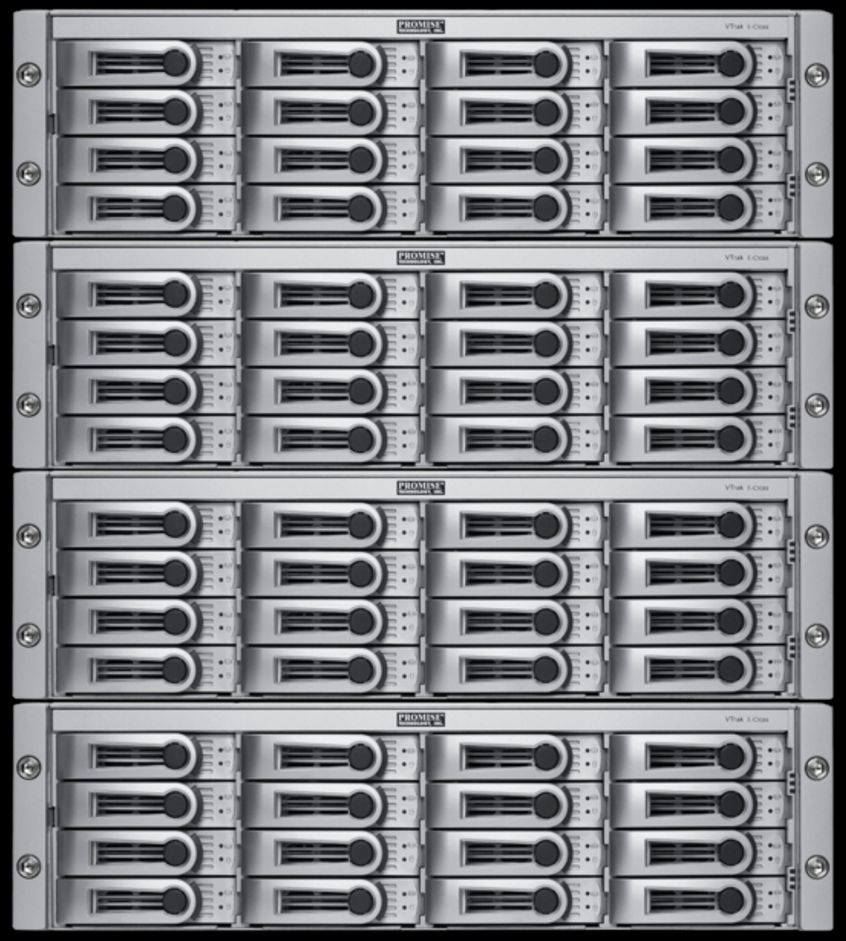


Xsan Volume Scenarios

Volume Configuration Settings

- Uncompressed HD Video
- Standard Definition Video
- General File Server
- Home Directory Server
- Mail Cluster
- Podcast Producer Cluster
- Custom





Tuning to the App

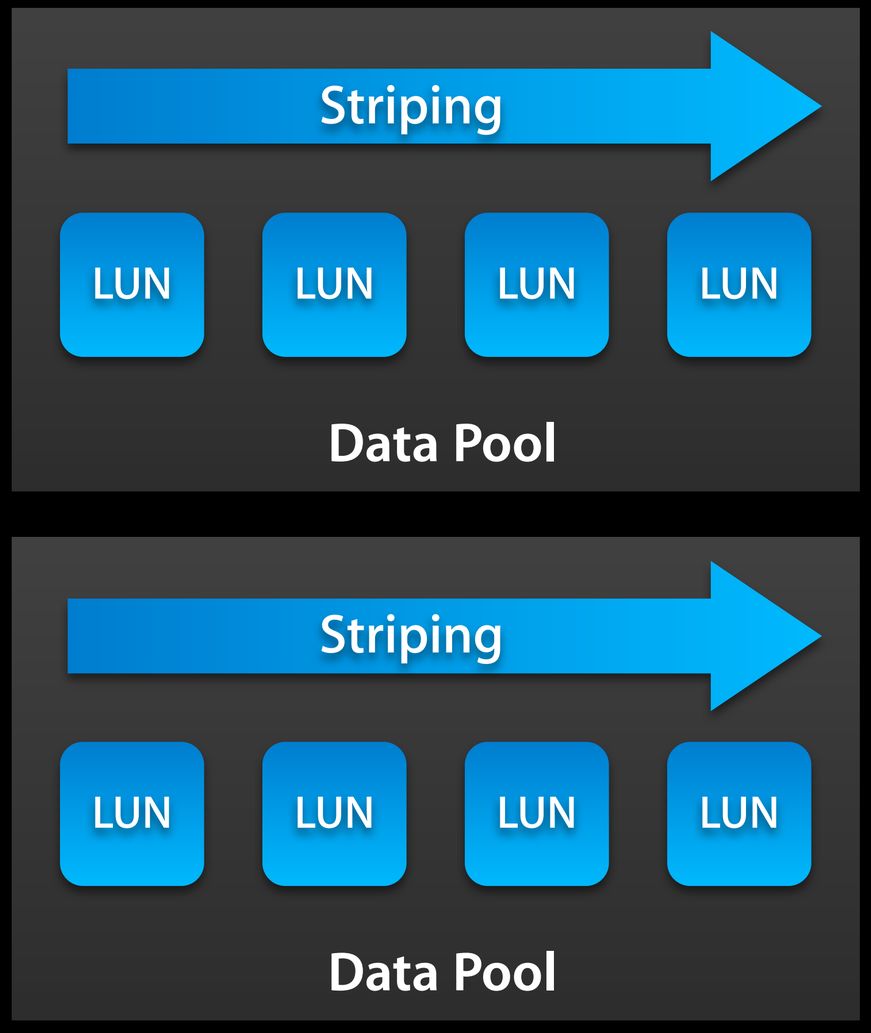
Storage pool sizing

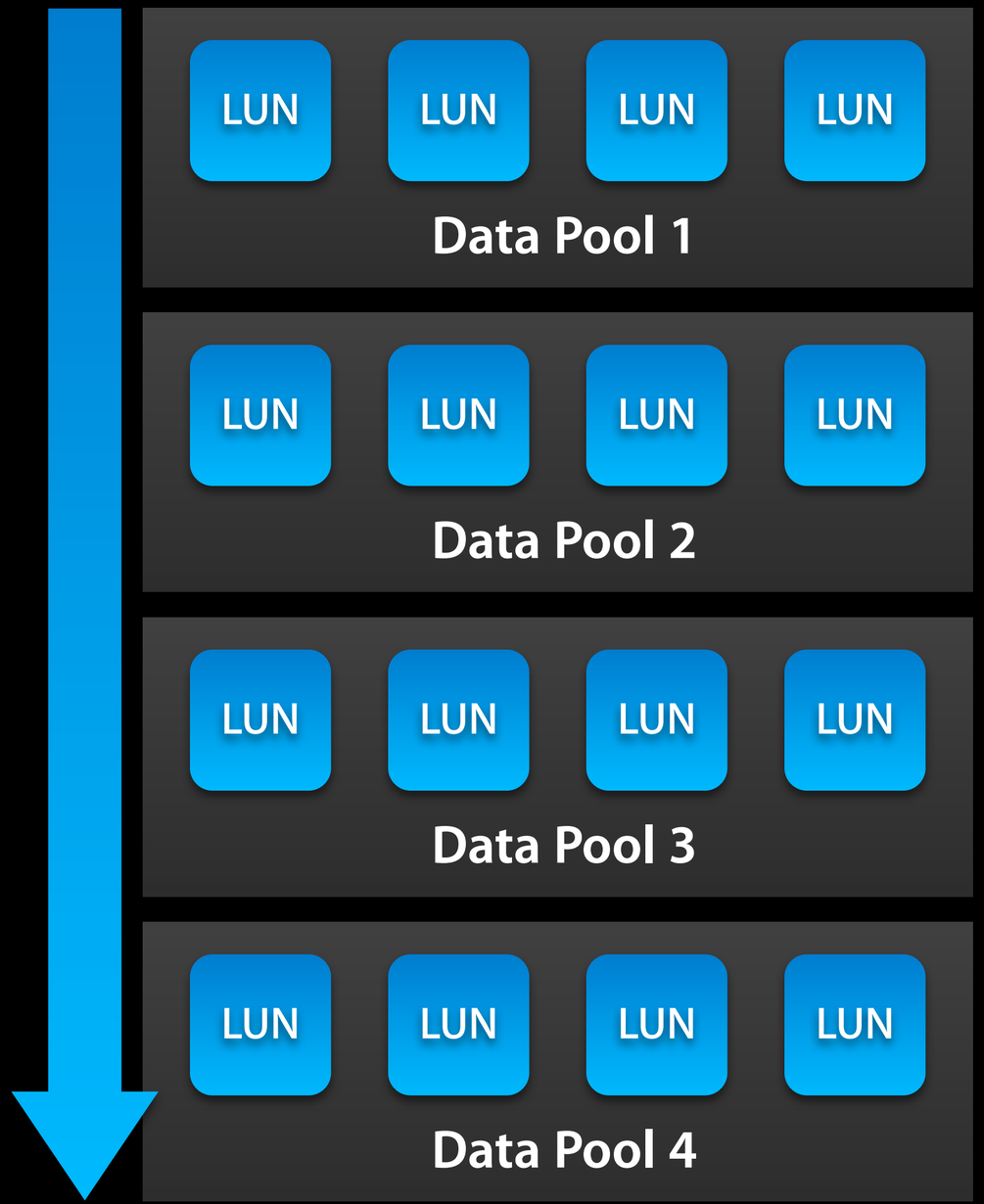
- More LUNs, more spindles
- Pools should be uniform

Tuning to the App

Block and stripe sizing

- Larger helps throughput
- Smaller conserves space





Tuning to the App

Allocation strategy

- Method for filling pools
- “Round-Robin” distribution
- “Balance” after expansion

Tuning to the App

Performance monitoring

- Grep SUMMARY in cvlog for hourly FSM report
- Monitor copy performance
- Fibre channel switch
- Storage device

Volume Scenarios

Video solutions

- Presets use four LUNs per pool
- Tuned for large files and high throughput
- Appropriate for Final Cut Studio, Final Cut Server, and Podcast Producer

Volume Scenarios

IT solutions

- Presets use 1–2 LUNs per pool
- Tuned for smaller files
- Leverage multiple MD LUNs
- Appropriate for PHDs, general file services, mail services

Volume Scenarios

Computer forensics

- No preset, but use larger pools
- Tune for large files

Backing Up Your Config Files

- When modifying the SAN, make multiple copies to CD, DVD, etc!

```
$ sudo cvgather -f <YOURVOLUMENAME>
```

- Preserves all your geometry information
- Back up configurations of all MDC individually
- Run launchd job to back up logs weekly

What’s New in 2.2

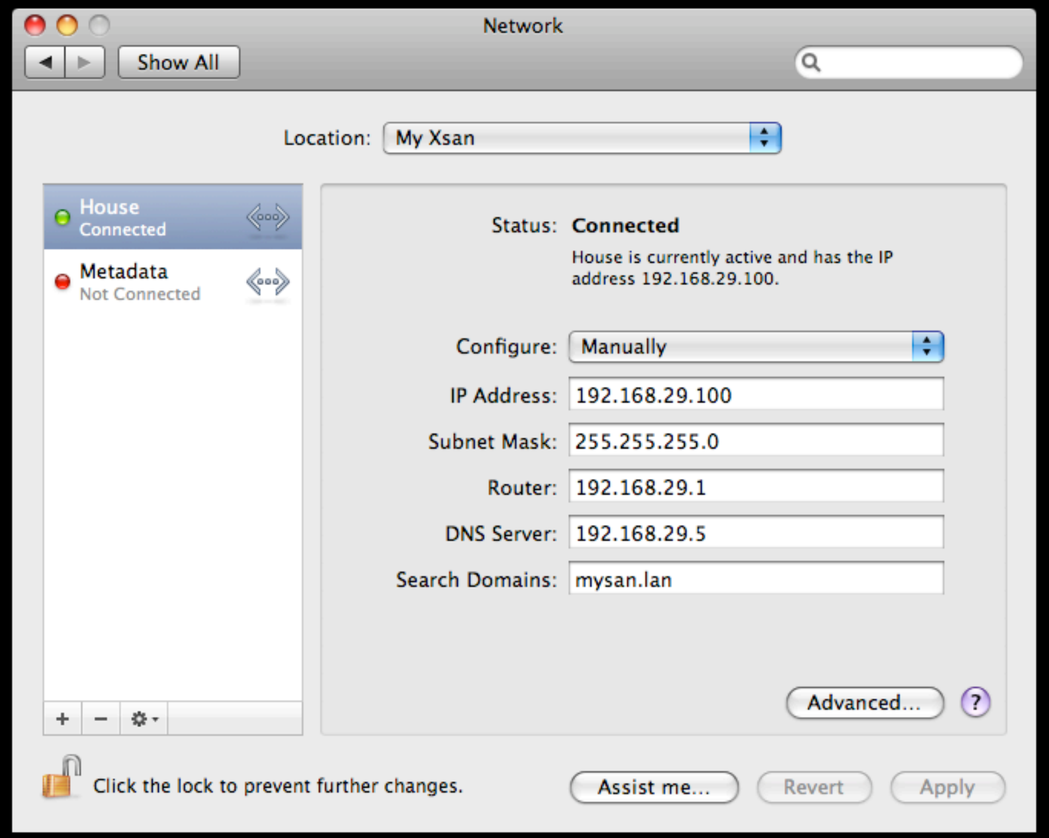
Xsan 2.2

- Bug fixes in Xsan Admin
- Full 64-bit support on Snow Leopard
- Native Finder info and resource fork (extended attributes)
- No more Xsan 1.x support
- Intel only (2.1.1 still supported for PPC clients)
- Future release, on ADC now!

Xsan Best Practices

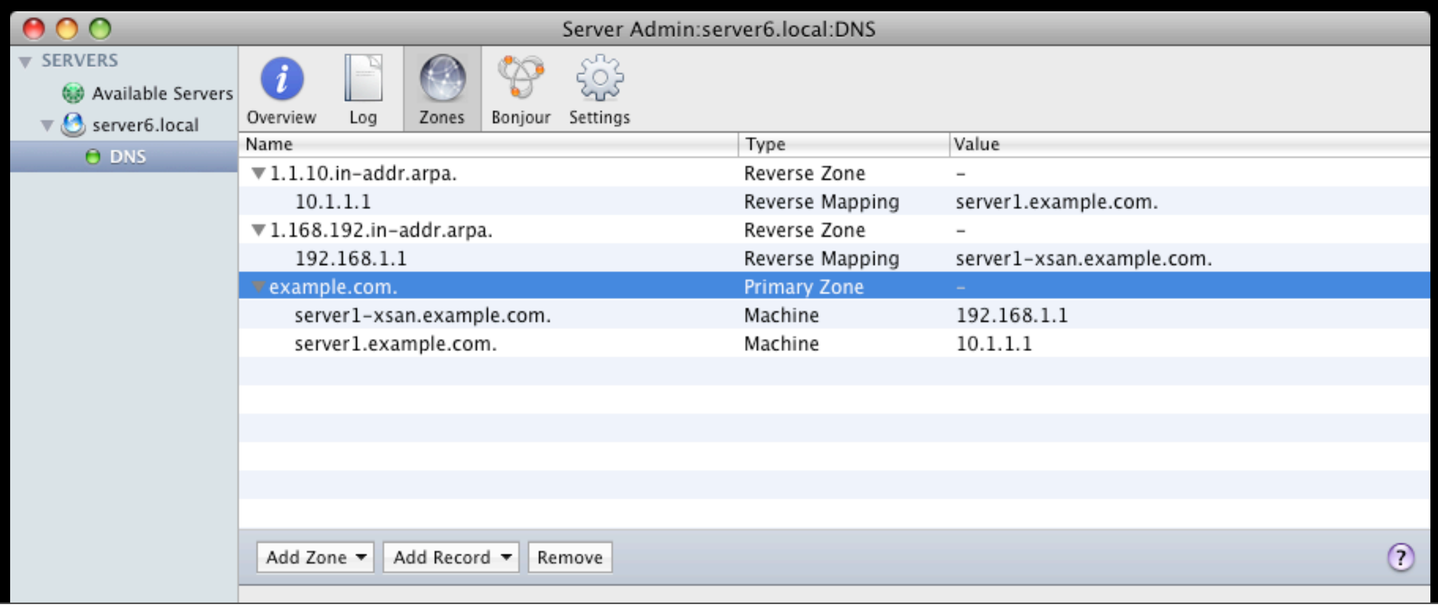
Networking

- Gigabit ethernet preferred
- Statically assign network configuration
- Unique IP network for metadata
- Avoid VLANs for metadata network
- Enable Port Fast



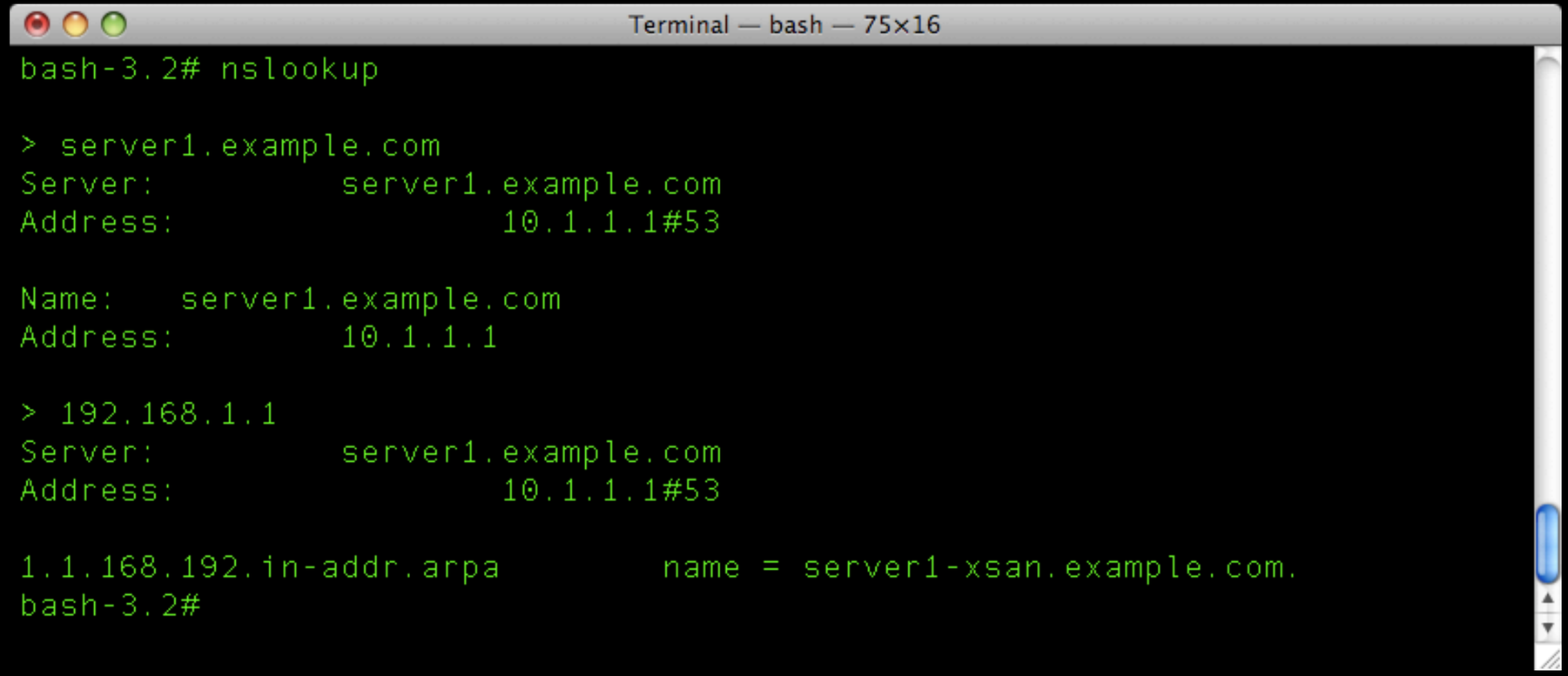
DNS Best Practices

- Forward/reverse DNS records for Public and Metadata network of all Xsan clients and servers
- Public and Metadata (A) records can be hosted under the same domain
- You can use existing DNS servers such as AD based Windows DNS server, VitalQIP, BIND, etc.
- Host files can be used for Metadata network, but DNS is always recommended



Troubleshooting DNS

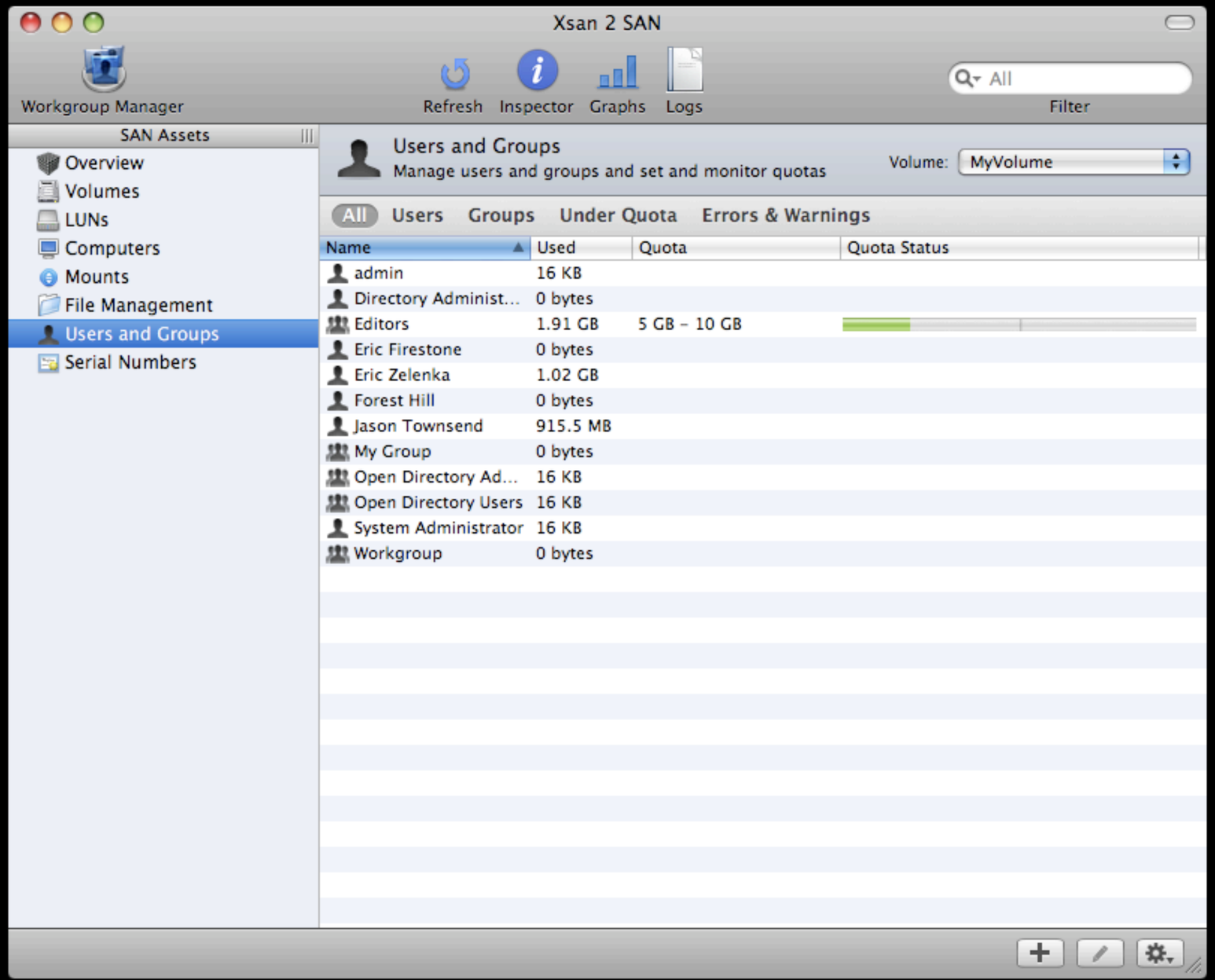
- Verify records using dig, host or nslookup commands
- Set hostnames using `sudo scutil --set HostName <fqdn>`
- Verify DNS: `sudo changeip -checkhostname (server only command)`



Directory Services

- Shared file system requires a shared directory system
- Leverage Open Directory or Active Directory
- Unique IDs for user accounts

User and Group Management



Access Control Lists

	User or Group	Type	Permission	Applies To
ACL				
	Eric Zelenka	Deny	Custom	
	Editors	Allow	Full Control	This folder, Child files, Child folders, All descendants
POSIX				
	admin	Allow	Read & Write	This folder
	editors	Allow	Read Only	This folder
	Others	Allow	Read Only	This folder

- ▶ ☑ Administration
- ▶ ☐ Read
- ▶ ☐ Write
- ▶ ☐ Inheritance

+ − ✎ ⚙

Cancel OK

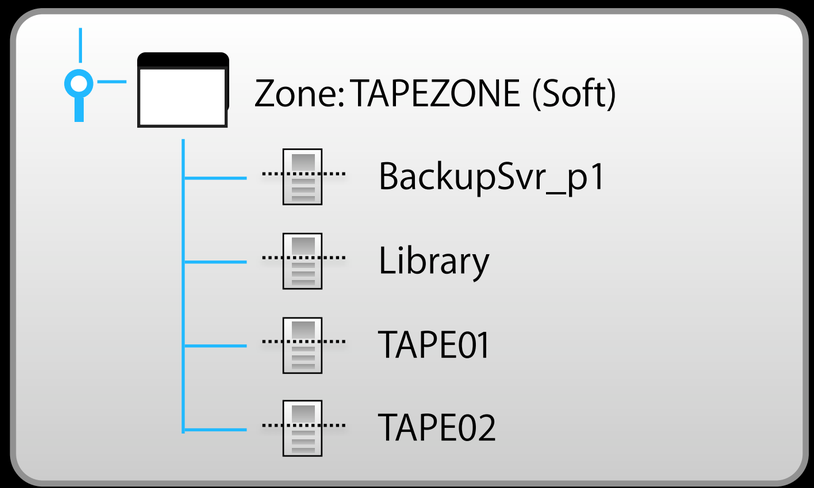
XSan Backup Software Matrix

For Mac OS X Platform

Software	Backup Client Agent	Backup Server	Xsan Support	Leopard 10.5.x
Atempo—TIMEnavigator	✓	✓	✓	✓
ARCHIWARE—PresSTORE	✓	✓	✓	✓
BakBone—NetVault	✓	✓	✓	✓
Tivoli—TSM	✓		✓	✓
Symantec Veritas Netbackup	✓		✓	✓

Tape Backup

- Zone tape drives to one port of backup server
- Turn RSCN suppression off for tape drives



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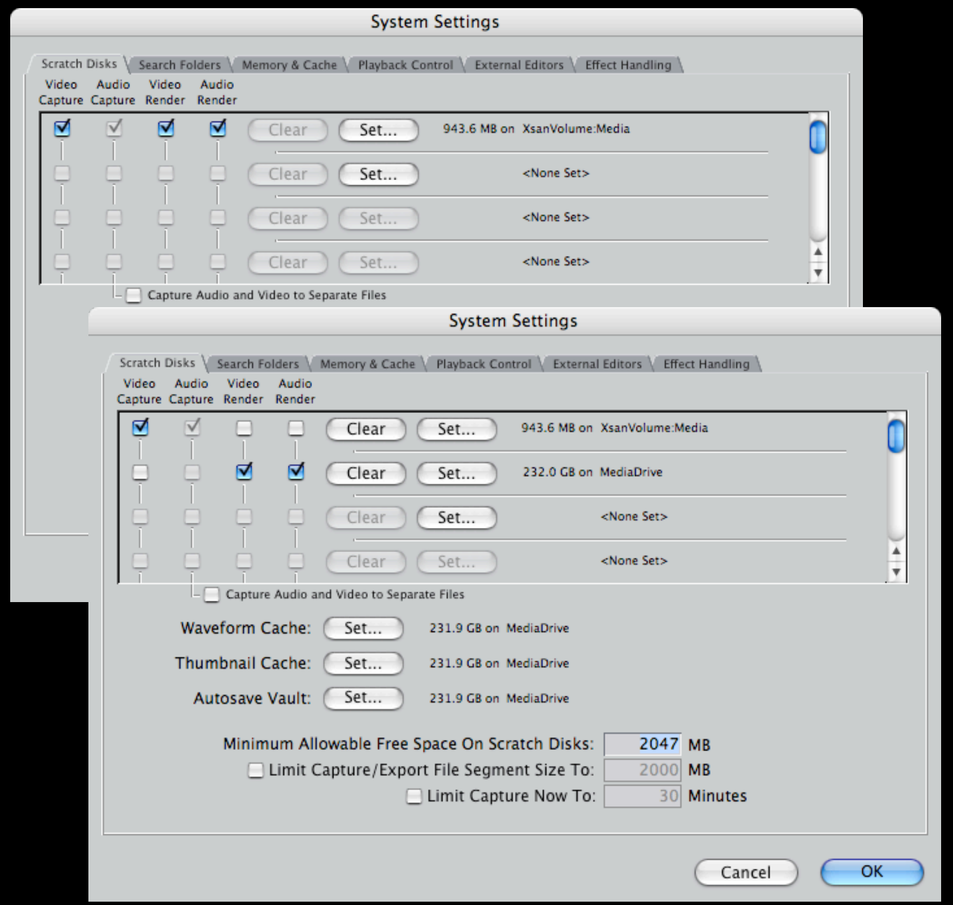
Symantec Veritas Netbackup	✓		✓	✓

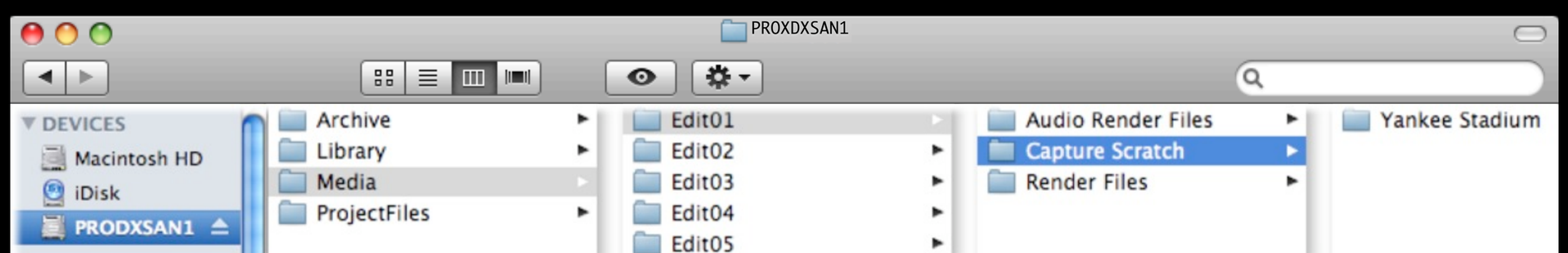
File Management

File Organization

Final Cut

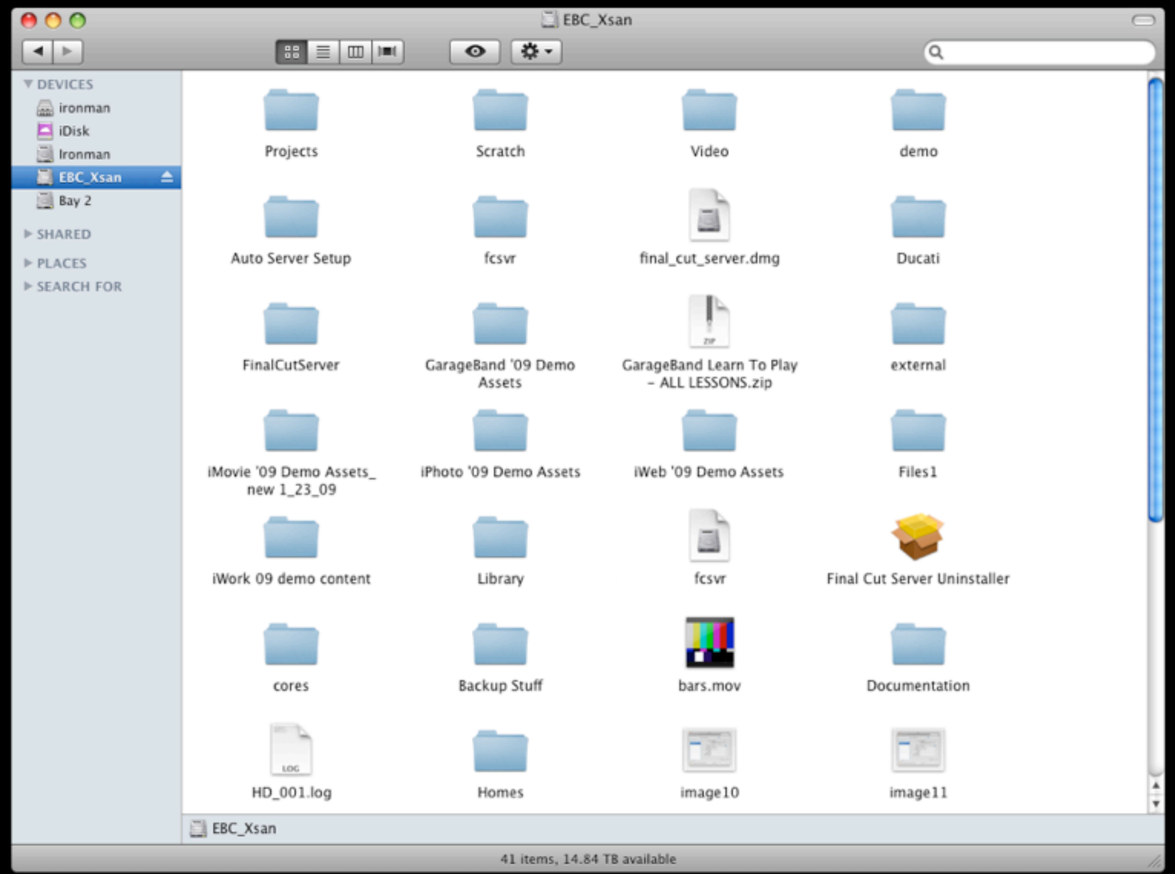
- Capture and Render settings
- Final Cut Server integration





File Organization

General file services



- Don’t simply reshare volume
- Leverage ACLs
- Simplified top-level structure

File Organization

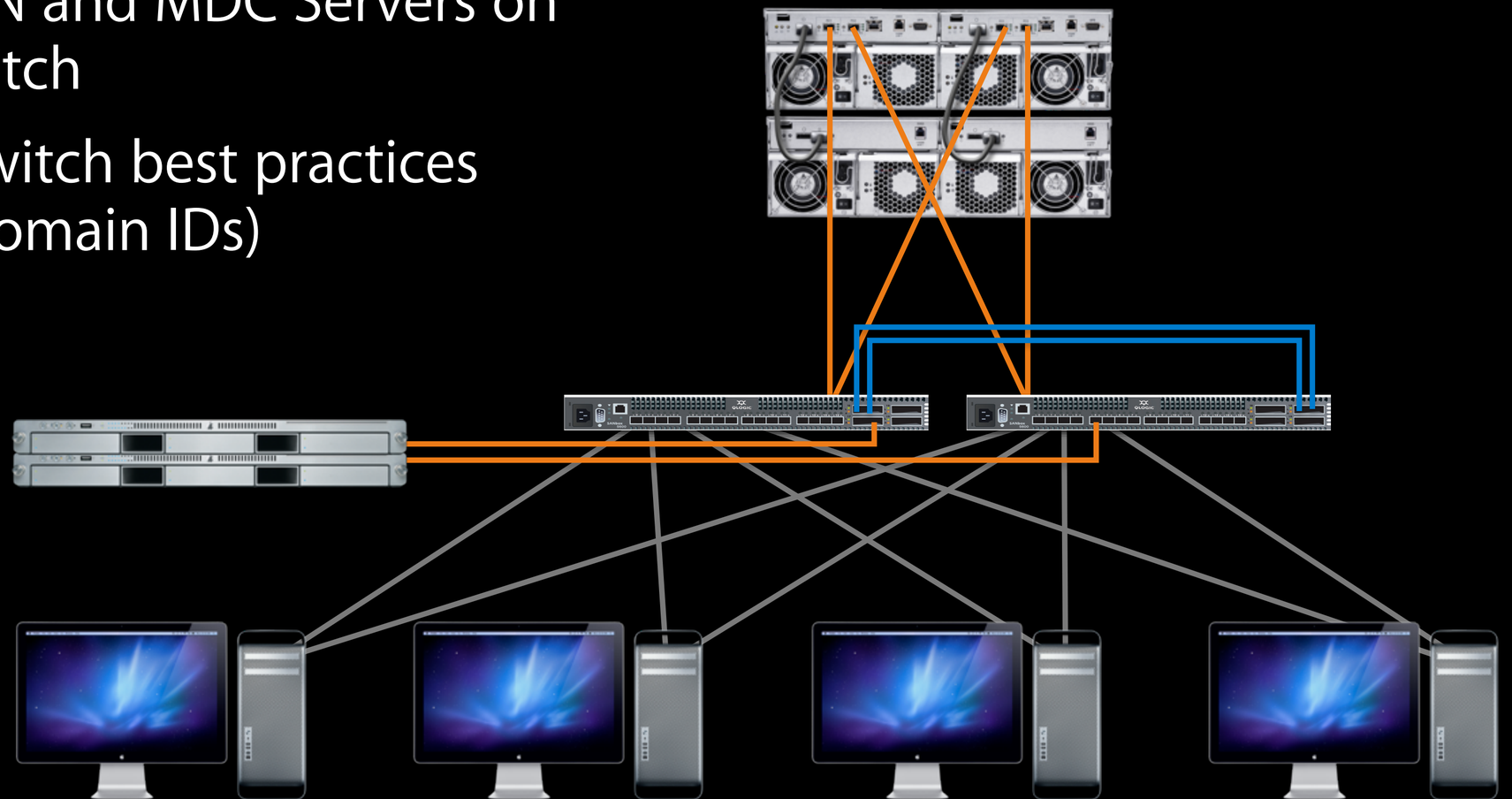
Other services

- Podcast Producer
- Mail

Fabrics and Interconnects

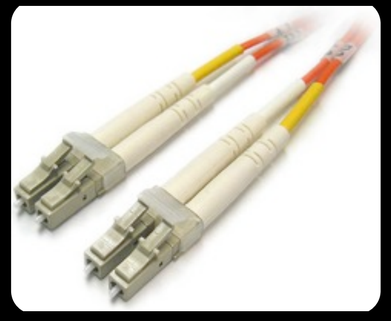
Designing a SAN fabric

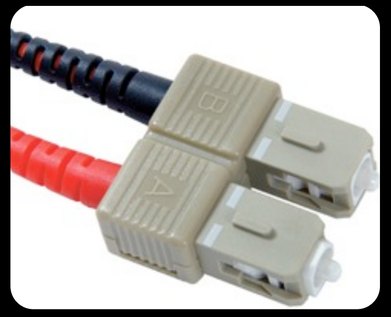
- Dual connect each client to FC Switches
- Take advantage of multipathing
- Keep MDC LUN and MDC Servers on same fibre switch
- Follow fibre switch best practices (e.g. locking domain IDs)



Fibre Channel Interconnects

- Use included copper cables for up to 3m
- Multimode optical cables for ~300–500m
- Single-mode optical cables for up to 10km
- Distinguish between LC, SC, and ST connectors
- Don’t forget two SFPs per optical link!
- Avoid mismatching transceivers

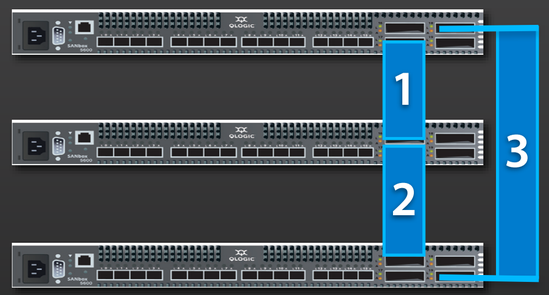




QLogic Stacking Interconnects

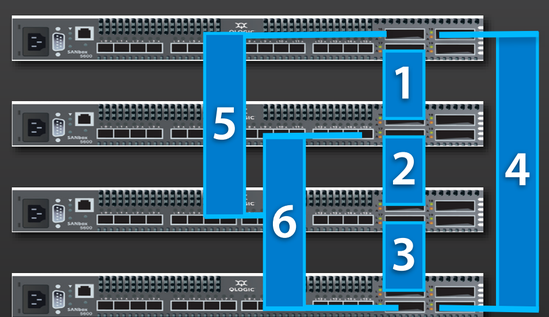
Redundant Stack

Two 3" XPAK Cables



Cascade Loop

Two 3" XPAK Cables
One 9" XPAK Cable

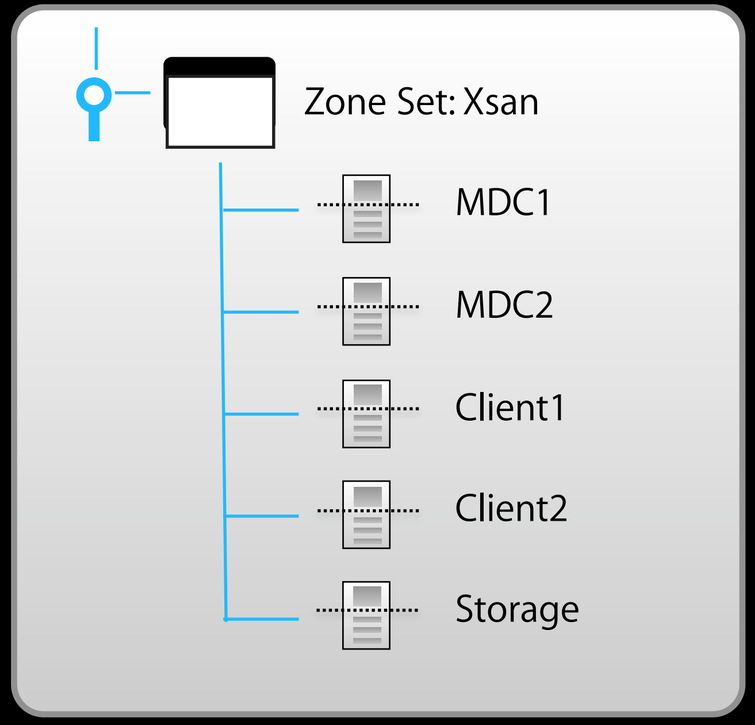


Full Mesh

Three 3" XPAK Cables
Three 9" XPAK Cables

Fiber Zoning

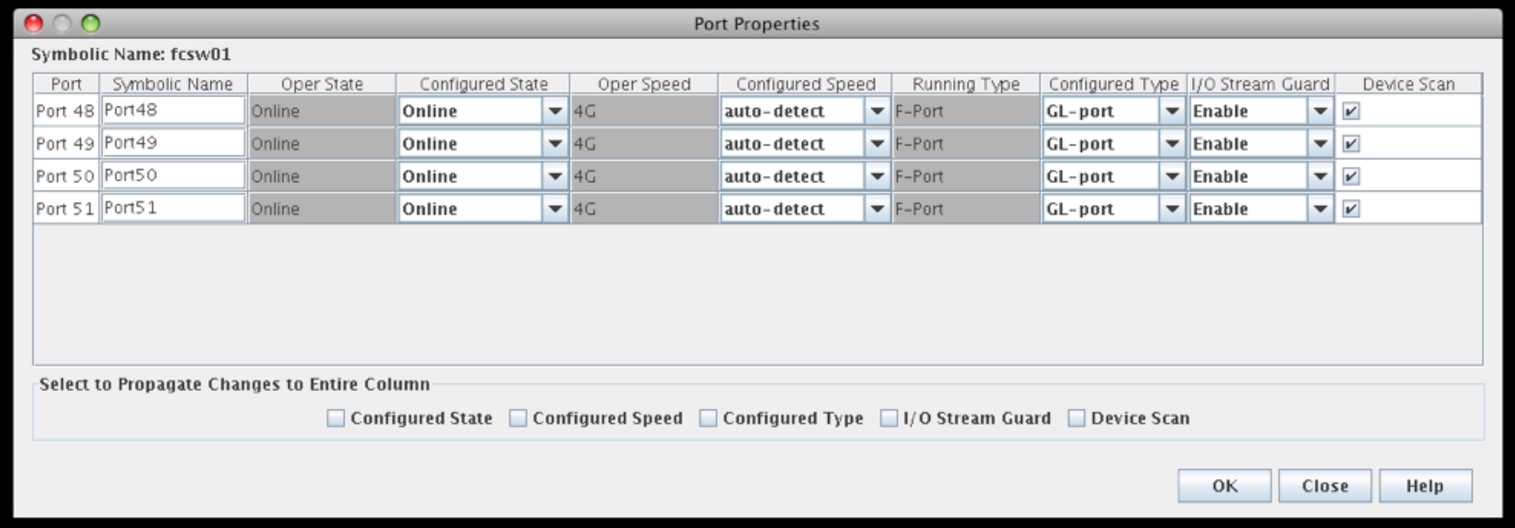
- Create soft zone for storage and each Xsan client
- Allow each Xsan client to see storage only
- Prevents client interference



Fiber Port Settings

Port settings

- Enable RSCN suppression on clients (initiators)
- Disable RSCN suppression on storage (targets)
- Configured Speed set to autodetect (or 2GB for PPC)
- Configured Type set to GL-Port
- Device Scan enabled



Power and Cooling

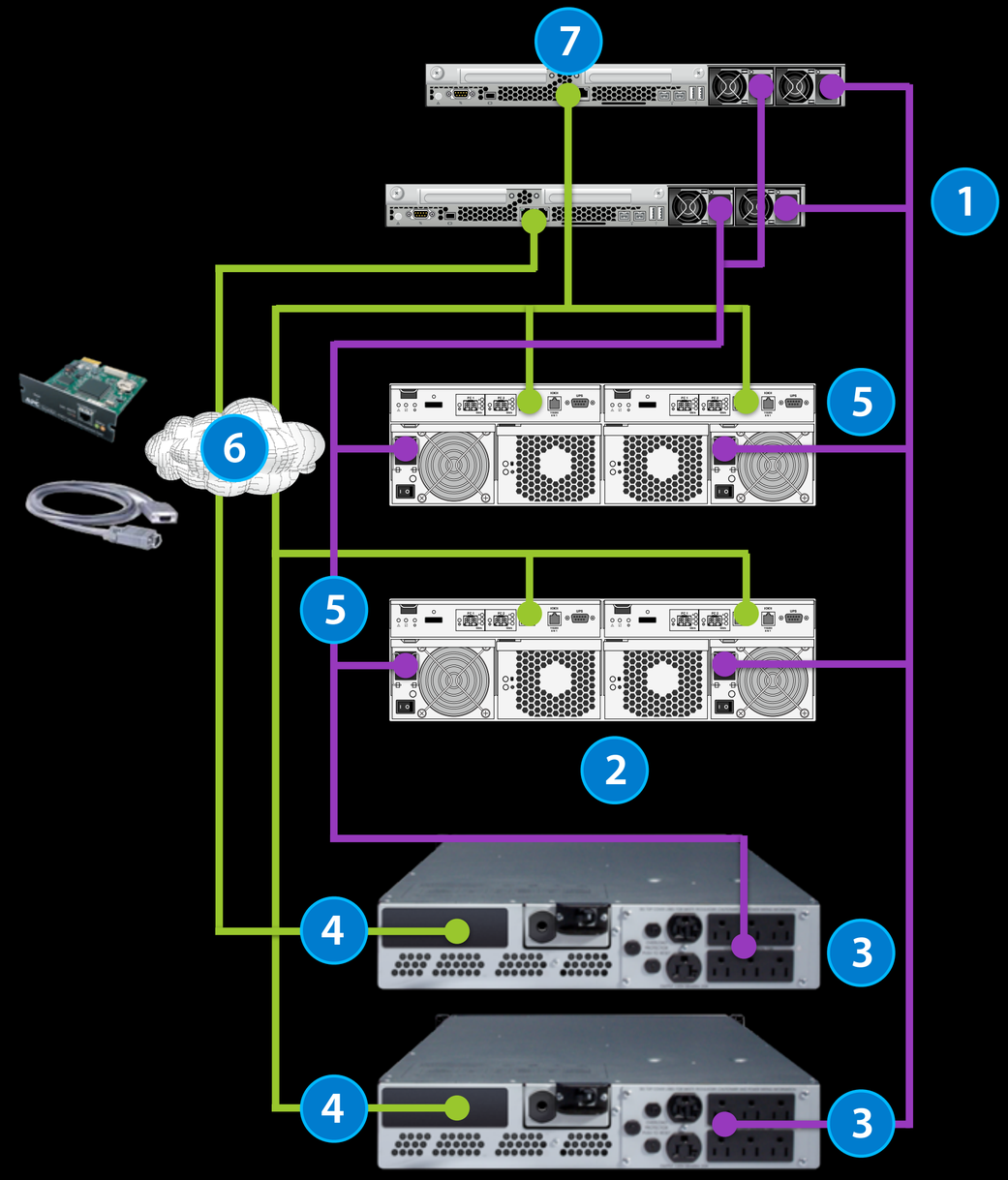
Power Distribution and Cooling

- Plan sufficient cooling and power in the data center
- Keep temperature sensor clear of AC
- 1 Ton AC unit = 12000 BTU/hr

	PSU	Draw	Thermal
Apple Xserve (8 core)	750 W	515 VA	1250 BTU/hr
Promise VTrak	460 W	640 VA	1525 BTU/hr
24-port Ethernet switch	100W	250 VA	720 BTU/hr
20-port FC switch	120W	300 VA	890 BTU/hr

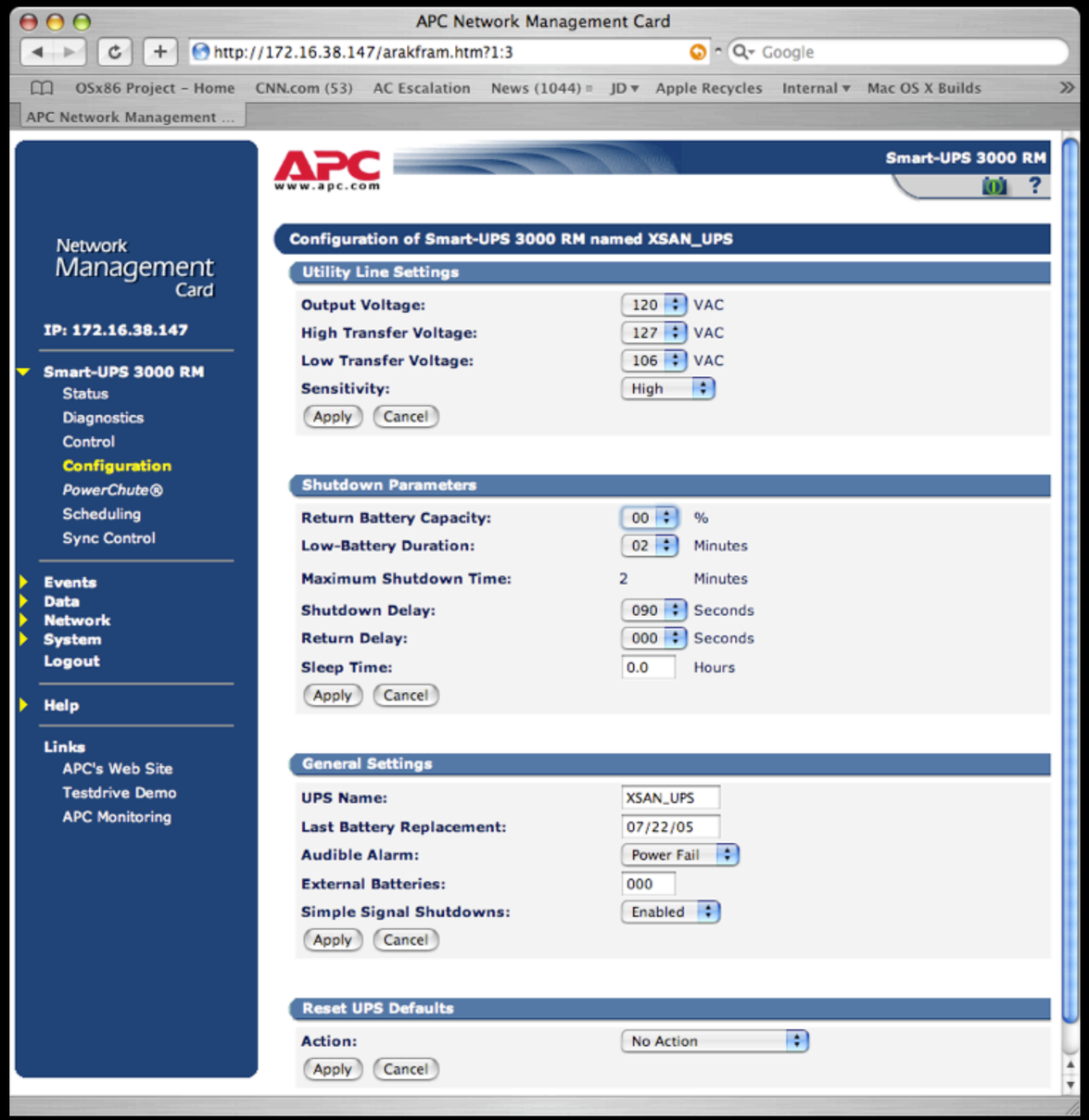
UPS Integration

1. Xserves
2. Storage Arrays
3. APC Smart-UPS
4. AP9617 Network Management Card
5. AC Power Cables
6. Ethernet LAN
7. Powerchute Network Shutdown v2.2.3

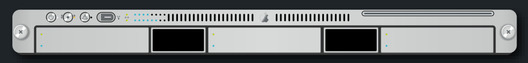
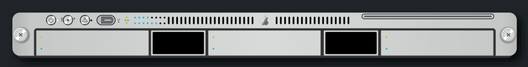


UPS Components

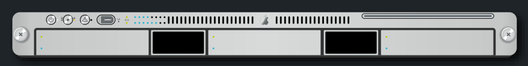
- Match PDUs plugs to UPS outlets
- Redundant connections (distribute PSUs across PDUs)
- Install APC PowerChute Software for controlled shutdown
- Set email notifications on all SNMP cards



Shutdown Procedures

Unmount volumes	Unmount from Xsan Admin
SAN clients	Workstations, reshare file servers
Secondary MDC	
Primary MDC	
Storage	RAIDs, tape drives
Servers	OD, DNS, DHCP, Mail, etc.
Switches	Fibre Channel, Ethernet

Startup Procedures

Switches	Ethernet, Fibre Channel
Servers	OD, DNS, DHCP, Mail, etc.
Storage	RAIDs, tape drives
Primary MDC	
Secondary MDC	
San clients	Workstations, reshare file servers
Mount volumes	Mount from Xsan Admin

Getting Support

Recovering Your SAN Volume

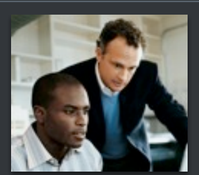
- Use the free 90 day AppleCare support
- You should first call into AppleCare using your Xsan support agreement
- http://support.apple.com/kb/HT1081
- Unmount all volumes and stop volume, then run
- Run cvfsck in “read-only “ mode

```
sudo cvfsck -nv <Volume_Name>
```

- If problem detected

```
sudo cvfsck -wv <Volume_Name>
sudo cvfsck -nv <Volume_Name> (verify successful repair)
```

One-Stop Expert Support

	Solutions	Products
	AppleCare Protection Plan—Hardware break fix	Per Mac
	AppleCare Premium Service and Support Plan Hardware break fix	Per Xserve
	Xserve and Promise Parts Kit—Self repair	Per location/ deployment
	AppleCare Xsan Support for Xsan and RAID Admin software support and hardware troubleshooting	Per Xsan node
	Mac OS X Server Software Support for networking and workflow, command line, heterogeneous environments	Per deployment
	Apple Professional Services—Installation help	Per deployment

Promise Update

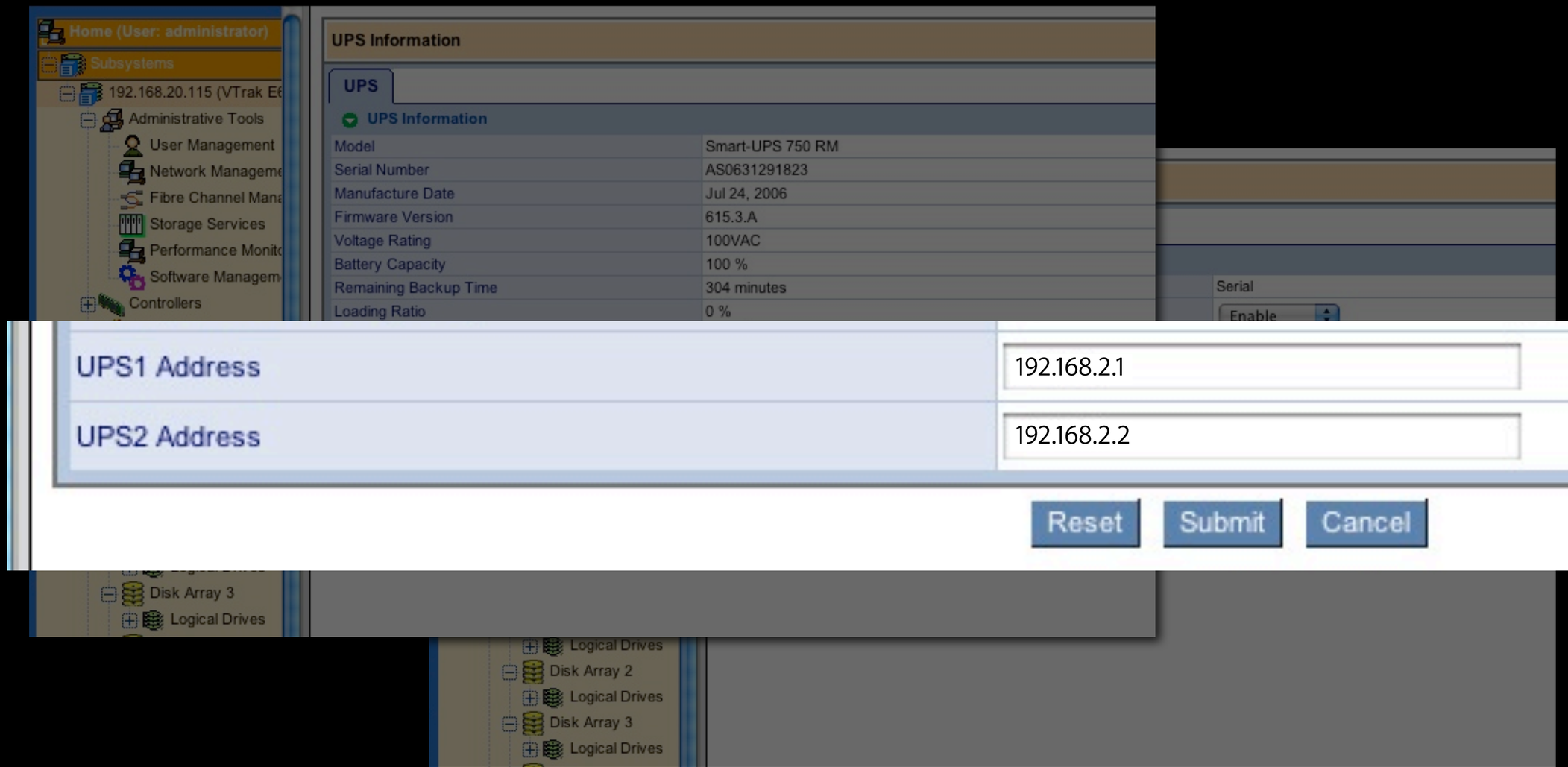
Promise Update

New features in firmware update 2.5

- Future release:
  - UPS support!
  - NTP and SSH support as well
  - Performance changes tailored for realtime ingest and playback
  - Ability to export configuration settings from WebPAM
  - Graphical performance monitor
  - Serviceability enhancements

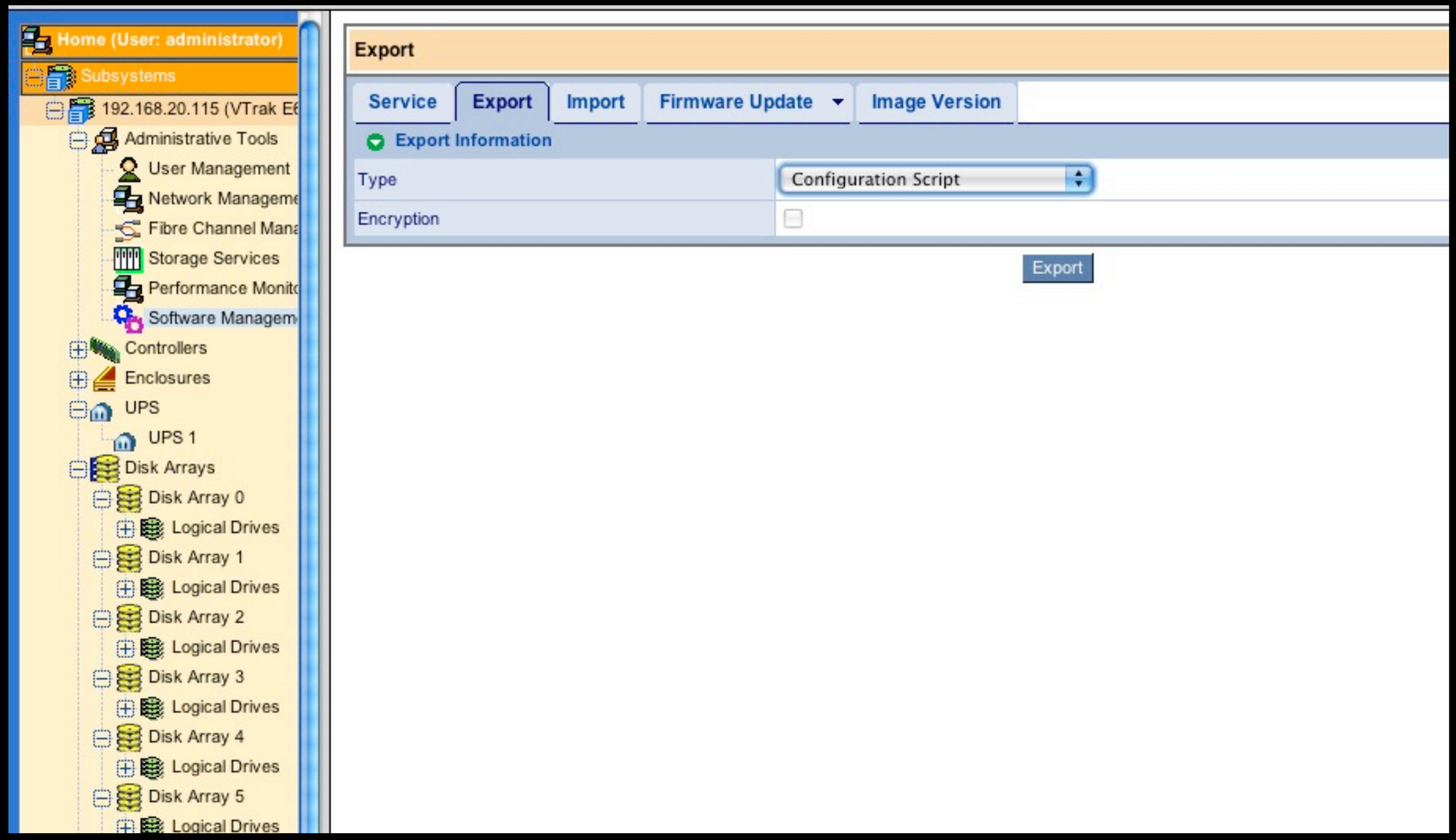
Promise Update

UPS support



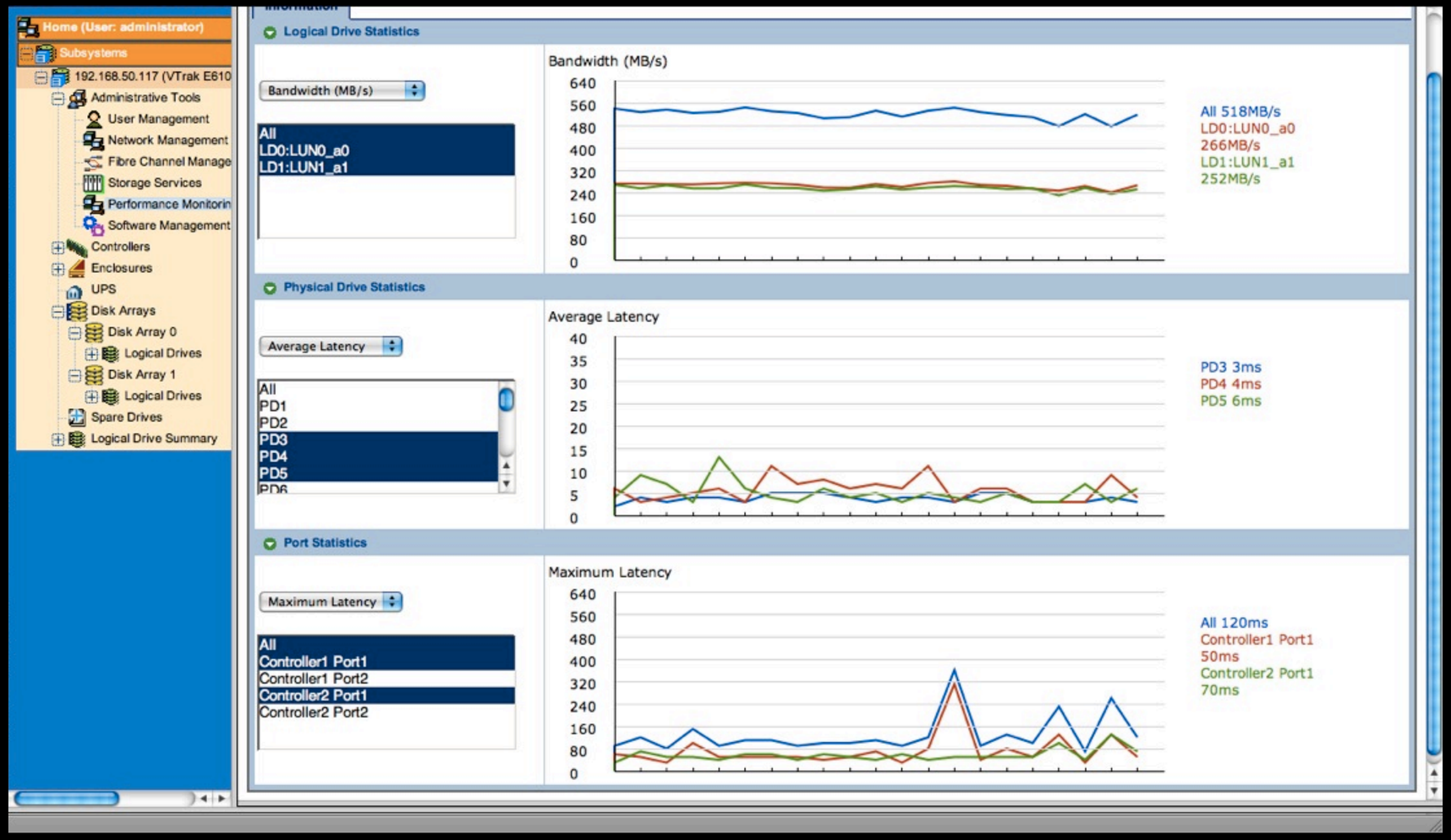
Promise Update

Configuration export



Promise Update

Graphical performance monitor



Promise Update

RAID 6 findings from the field

- RAID 6 is striped with dual parity
- There is inherent degraded write performance as parity data is written to multiple drives
- In real world performance testing with a mix of capture and playback, the performance change is negligible

Promise Update

More findings from the field

- SAS vs. SATA
  - SAS for metadata LUN offers improvements
  - Use appropriate dedicated spares in mixed chassis
- Forced read-ahead controller caching
  - Helps with large files
  - Hinders metadata and random access
- Configuration scripts
  - Search Apple KB for “promise vtrak configuration script”
  - Customize as needed for the application

Wrap Up

- Thank you for using Xsan!
- Xsan allows highly flexible use of storage for many workflows
- Xsan allows shared access at high speeds
- Planning is everything!
  - Good network setup is essential
  - Don’t cut corners!!!
  - Backup is VERY important

More Information

Apple Professional Services—US
www.apple.com/services
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Labs

Xsan 2 and Storage Area Networks Lab	Information Technologies Lab Friday 2:00PM
Podcast Producer Lab	Information Technologies Lab Friday 12:00PM

Q&A

WWDC Session Survey

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WWDC09